Health and Safety Policy

Hazardous Substances

UHSP/15/HS/10 Schedule 3.8

Hazardous Substances - Control Measures

Local Exhaust Ventilation (LEV)

(Including Fume Cupboards)

This document is a schedule from University Hazardous Substances Policy and it should be used in conjunction with the Policy.

Aims of the policy

The Policy aims to assist Budget Centre's in achieving effective planning, maintenance, and sustainable use of local exhaust ventilation in laboratories, workshops and other specialised facilities.

It provides information on the design, installation, use and maintenance of LEV systems in order for the University to meet its legal obligations and for systems to provide optimum protection.

Scope of the Policy

This policy applies to:

- All types of local exhaust ventilation including fume cupboards and recirculating fume cupboards.

Exceptions to the Policy

- Microbiological Safety Cabinets (MSCs) are covered by the University's Guidance on the Management of Biological Risk, available on the Health and Safety Unit intranet; https://intranet.birmingham.ac.uk/hr/wellbeing/worksafe/biological/index.aspx

POLICY

For LEV systems to provide maximum control and efficiency key milestones must be met:

- Specification – all LEV must be correctly specified, to take into account the contaminant, its hazards, the sources to be controlled, working requirements of operatives and the level of exposure control required.
- Design and Installation – the system must be designed and installed by a competent person to meet the requirements of the specification. The system must be supplied with a User Manual and Logbook.
- Commissioning – the system must be commissioned to prove it effectively controls exposure and meets the design specification.
- Maintenance – LEV systems must be maintained in accordance with the schedules in the User Manual and undergo routine checks.
- Annual Thorough Examination and Test – all LEV must undergo an annual thorough examination and test by the University Insurer.

Guidance on achieving these key milestones and the responsibilities set out below can be found in the guidance document 'Safe and Sustainable LEV' in Appendix 1 of this Schedule, along with a checklist for each action.

Heads of Budget Centres must make arrangements in areas under their control to ensure:

- New LEV systems must be approved by Estates and the Health and Safety Unit before being purchased.
- Estates and the Health and Safety Unit must be notified of any proposed modifications to existing LEV systems.
- Estates and the Health and Safety Unit must be notified of any proposed changes to the process or equipment that the LEV is serving, type of contaminant or workplace layout.
- Provision of sufficient information for specification of new LEV.
- Arrangements are in place for LEV to be maintained in accordance with a maintenance schedule and records kept.
- LEV log books are kept up to date.
- All users must be provided with sufficient information and training so as to operate the LEV correctly and records maintained.
- LEV that has failed its performance testing must not be used for hazardous activities until it has been repaired, replaced or additional interim measures to reduce exposures implemented.
- Nominated individuals are identified with overall responsibility for ensuring the safe use, maintenance and testing of LEV in each location

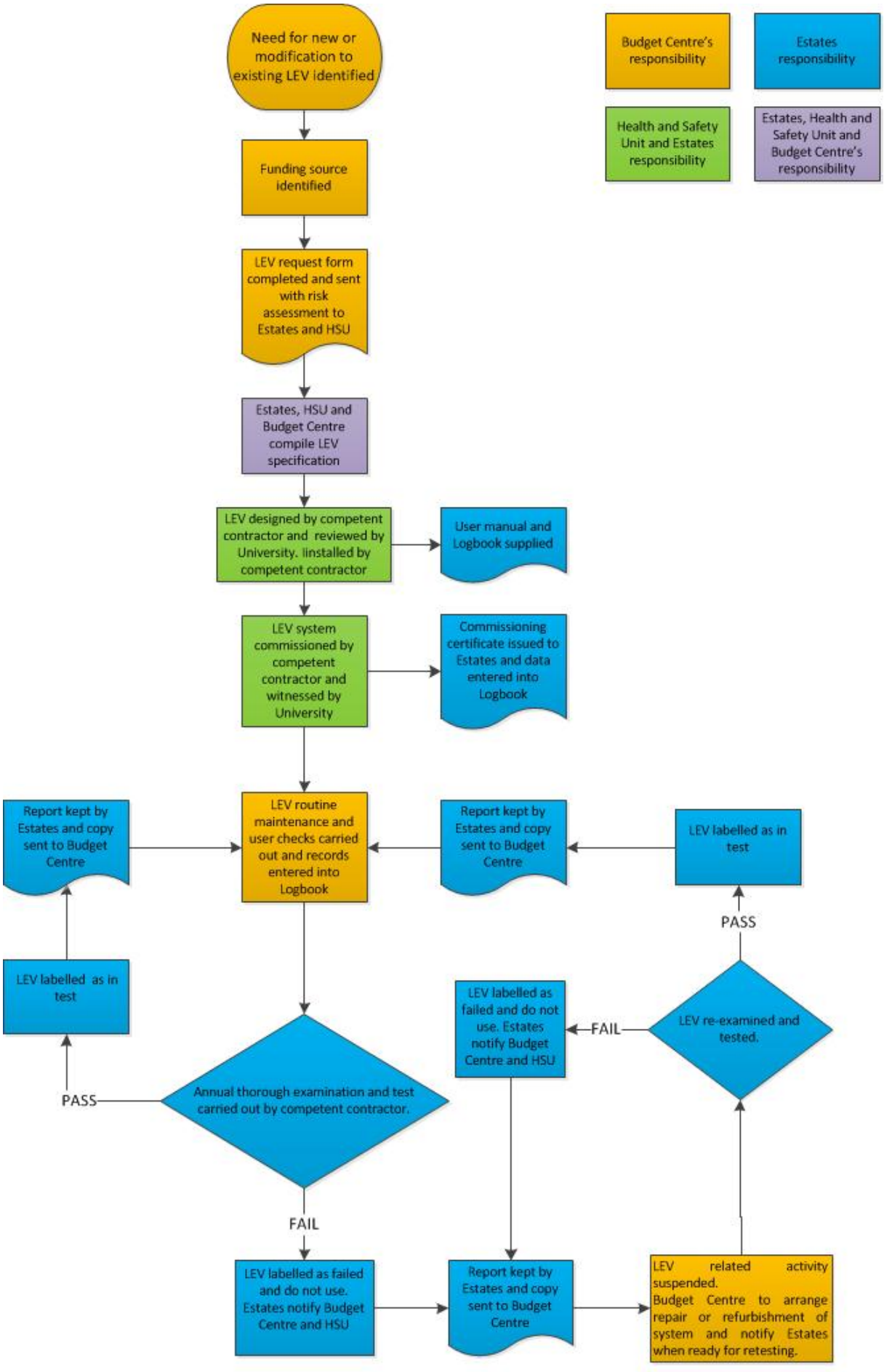
Director of Estates must make arrangements to ensure

- A register of all LEV systems along with commissioning data and annual examinations and tests is maintained.
- Schools are notified of LEV failing the annual examination and test.
- All registered LEV are examined and tested annually by the University Insurer.
- Requests for new LEV or modifications to existing LEV are reviewed.
- LEV systems in refurbishments and new builds meet the requirements of this policy and HSG 258.
- LEV must be designed and installed by a competent engineer.
- LEV must be supplied with a log book and user manual by the manufacturers.
- Commissioning of LEV is witnessed (by a competent person(s) and relevant signed commissioning documents provided to the University).

Assistant Director of HR for Workplace Wellbeing must make arrangements to ensure

- Requests for new LEV or modifications to existing LEV are reviewed.
- LEV designs and specifications are reviewed.
- Suitability of existing LEV systems are reviewed where there is a proposed change to the process or equipment that the LEV is serving, type of contaminant or workplace layout.
- Commissioning of LEV is witnessed (by a competent person(s) and relevant signed commissioning documents provided to the University.
- Assist in the identification of additional interim measures to reduce exposures for failed systems.

Process for Lifecycle of LEV


Need for new or modification to existing LEV identified
Budget Centre's responsibility
Estates responsibility
Health and Safety Unit and Estates responsibility
Estates, Health and Safety Unit and Budget Centre's responsibility
Funding source identified
LEV request form completed and sent with risk assessment to Estates and HSU
Estates, HSU and Budget Centre compile LEV specification
LEV designed by competent contractor and reviewed by University. Iinstalled by competent contractor
User manual and Logbook supplied
LEV system commissioned by competent contractor and witnessed by University
Commissioning certificate issued to Estates and data entered into Logbook
Report kept by Estates and copy sent to Budget Centre
LEV routine maintenance and user checks carried out and records entered into Logbook
Report kept by Estates and copy sent to Budget Centre
LEV labelled as in test
PASS
LEV labelled as in test
LEV labelled as failed and do not use. Estates notify Budget Centre and HSU
FAIL
LEV re-examined and tested.
PASS
Annual thorough examination and test carried out by competent contractor.
FAIL
LEV labelled as failed and do not use. Estates notify Budget Centre and HSU
Report kept by Estates and copy sent to Budget Centre
LEV related activity suspended.
Budget Centre to arrange repair or refurbishment of system and notify Estates when ready for retesting.

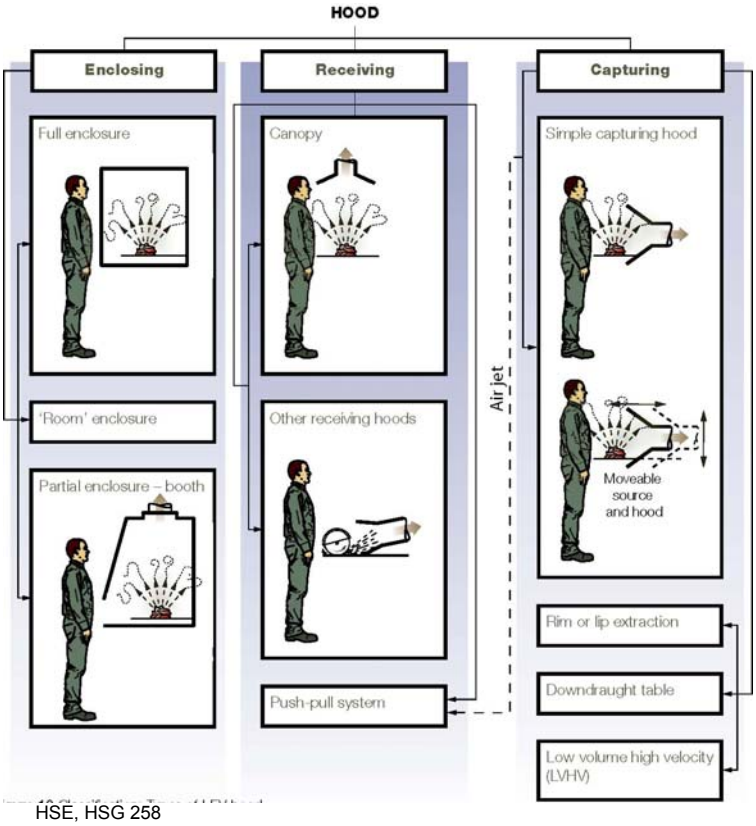
Introduction to LEV

Local Exhaust Ventilation (LEV) systems provide a very effective means of controlling exposures to airborne contaminants such as dust, mist, fume, vapour or gas. However, they can also be ineffective if designed, installed, used or maintained incorrectly. This Schedule of the Hazardous Substances policy contains information which will assist in ensuring University LEV systems provide the maximum amount of protection from airborne contaminants.

Most LEV consist of the following components:

- *Hood:* This is where the contaminant enters.
- *Ducting:* This conducts the air and contaminant from the hood to the discharge point.
- *Air cleaner:* This filters or cleans the extracted air. Not all systems need air cleaning.
- *Air mover:* The fan that powers the system.
- *Discharge:* This releases the extracted air to a safe place.

LEV systems have a wide range of designs, shapes and sizes, but fall into 3 basic design categories:



HSE, HSG 258

Selection

LEV design is critical to the performance of the system and must match the process, contaminant and the working practices of the operator. Successful LEV systems contain, capture or receive the contaminant cloud within the LEV hood and conduct it away. Parts A, B, C and D in Figure 2 below must be considered in the specification and design of the system.

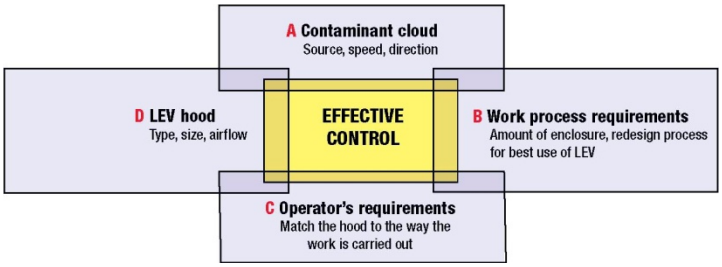

A Contaminant cloud
Source, speed, direction
D LEV hood
Type, size, airflow
EFFECTIVE CONTROL
B Work process requirements
Amount of enclosure, redesign process for best use of LEV
C Operator's requirements
Match the hood to the way the work is carried out

Fig2.

HSE, HSG 258

Where the need for a new LEV system or modification to an existing system has been identified, for which appropriate funding is available, Sections 1 and 2 of the proforma in Appendix 2 must be completed and sent, along with the relevant risk assessments for the process, to the Health and Safety Unit and Estates. The Health and Safety Unit and Estates will then complete the specification for the LEV system in conjunction with the Budget Centre. For fume cupboards, the fume cupboard request form in Appendix 3 should be completed and sent along with the relevant risk assessments for the process, to the Health and Safety Unit and Estates.

Budget Centre's must also notify the Health and Safety Unit and Estates where the process that the LEV is serving is altered; either by a change in equipment or type of substance used or emitted. The system will then be reviewed to ensure it is still capable of providing adequate protection.

In order for the University to meet its legal obligations relating to LEV all systems must be registered with Estates and all new systems and modifications to existing systems must be approved by Estates and the Health and Safety Unit. The lifecycle process for LEV systems is summarised in the flow chart in Figure 1.

Commissioning

Once the LEV has been installed it must be commissioned to prove it is capable of providing adequate control and meets the essential features of the specification. The commissioning must cover both 'hardware' such as the LEV and 'software' such as working practices; position and correct use of the LEV. This will require input from the supplier, School and Health and Safety Unit and Estates where necessary.

The commissioning of LEV sets the benchmark and standard for which the system is compared to during its annual statutory test and examination.

All LEV must be re-assessed and re-commissioned when there are:

- Changes in the process or the type of contaminant.
- Changes in the workplace layout.
- Any changes of equipment creating the source of contaminant.
- Any other changes to the system such as modifying a hood or duct or adding a new branch.

The commissioning of LEV must include the following stages:

Technical Performance:

The new system must perform to the standards and benchmarks that were specified, this will include measurements of:

- Flow volume rate throughout the system; hood faces; hood ducts, main duct.
- Static pressures throughout the system; hood ducts, main duct and across filters and fans.

- Hood face velocities.
- Fan speed, motor speed and electrical power consumption.
- Make up air supply.

Control Effectiveness:

The effectiveness of the LEV at controlling the contaminant must be assessed as part of the commissioning process and included in the commissioning report.

Assessing the effectiveness of control will depend on the type of LEV installed; systems of a design known to be effective, such as those of a standard design applied to a standard industry process and made to clear specifications require less investigation than those where design appears to be adequate but control is uncertain.

Methods to assess control effectiveness can include:

- Close observation of sources of contaminant and operator work practices.
- Smoke tests with the process running, with observation of smoke capture and leakage.
- Use of dust lamp to observe contaminant cloud behaviour with process running, where the contaminant is a dust or mist.
- Operator behaviour and the usability of the control systems.
- Air monitoring where control needs to be stringent.
- Containment testing for fume cupboards.

Where the effectiveness of LEV depends on operator behaviours the correct working methods and use of LEV must be recorded.

Commissioning Report:

All commissioned LEV must be supplied with a commissioning report containing the key results of the measurements. The report confirms that the LEV is performing as designed and delivers adequate control of exposure. The report forms the basis of the bench mark against which the system will be tested during subsequent annual test and examination.
The commissioning report must be included in the log book and a copy sent to Estates.

The report should contain:

- Diagrams and description of the LEV, including test points.
- Details of the LEV performance specification.
- Results of measurements such as pressures and velocities at stated points.
- Calculations.
- Written description of the commissioning, qualitative and quantitative tests and their outcome.
- Description of operator behaviour for optimum LEV effectiveness.

User Manual and Logbook

All new LEV must be supplied with a User Manual and Logbook as part of the design, installation and commissioning process.

The User Manual should cover the following; how to use the system, how to maintain it, key system components, the commissioning and bench mark criteria, thorough examination and test requirements and a list of possible things that could go wrong.

The Logbook should contain schedules and forms for recording regular checks, maintenance and repairs.

The User Manual and Logbook must be kept in the room containing the LEV.

Maintenance and Testing

Maintenance

In order for LEV systems to be sustainable they must be maintained and in good working order. The level of maintenance required will differ for different systems and levels of complexity. It is recommended Budget Centre's enter a Maintenance Agreement for LEV systems with Estates. Where Budget Centre's use the suppliers of the system for maintenance a record must be kept locally of all maintenance visits and a copy sent to Estates.

Routine Checks

All LEV systems must undergo routine checks to keep the system running properly. The frequency of routine checks (daily, weekly, monthly) will be determined by the complexity of the systems and level of control required. The frequency and description of tests required will be set out in the systems Logbook.

Budget Centre's are to measure the face velocities at LEV hoods on an annual basis with a calibrated anemometer and record them in the systems Logbook. This should ideally be 6 months after the thorough examination and test. Information on where to take measurements will be detailed in the User Manual and Logbook and covered in the LEV training course by the Health and Safety Unit. Variations in velocities can impact on the effectiveness of the system and are indicators that maintenance is required. Systems requiring further investigation should be reported to Estates.

Annual Thorough Examination and Test

All LEV must have an annual thorough examination and test by the University Insurer.

The University Insurer must have the following information made available when carrying out the annual thorough examination and test:

- LEV commissioning report.
- LEV user manual and log book.
- Previous examination and test report.
- Confirmation that there have been no changes to the LEV, process or contaminant since the last test.
- Chemical hazard and risk assessment form for the process.

The thorough examination and test procedure and methods are similar to the original commissioning exercise and must comprise of the following of 3 stages:

- A thorough visual examination to verify the LEV is in efficient working order, good repair and clean condition.
- Measuring and examining technical performance to check conformity with commissioning data.
- Assessment to check adequacy of control of exposure.

All LEV must be labelled to identify when the system was last inspected, whether or not it passed and when the next test is due.

The detailed examination and test report must be held by Estates for at least 5 years and a copy also sent to the Budget Centre to be held locally

Failed LEV

A system could fail its annual thorough examination and test for a number of reasons:

- No airflow.
- Poor state of repair (effects of which impacts on safe operation of the LEV and/or reduced protection for the operator).
- Blocked filters.
- Failure to contain or capture the contaminant cloud.
- Failure to meet the design technical performance criteria.

All failed LEV must be marked with a failed label to notify users that the system must not be used.

Estates are responsible for notifying the Budget Centre of the failure and pass on the examination and test report to the Budget Centre and the Health and Safety Unit. The Budget Centre is responsible for repairing or upgrading the LEV system and notifying Estates that the system is ready for re-testing. Estates policy 'Arrangements for the Statutory Inspection, Examination and/or Testing Equipment as Specified in University Policy' details the process for this in appendix 1 (https://intranet.birmingham.ac.uk/hr/documents/public/hsu/hsupolicy/emsiet.pdf).

The Budget Centre is responsible for implementing interim control measures to ensure that exposure is still controlled, these measure could include the following:

- Stopping the process until the LEV has been repaired and passed the test and examination
- Adapting the process to minimise emissions, frequency or duration of use
- Altering working practices
- Provision of appropriate Respiratory Protective Equipment (RPE), upon consultation with the Budget Centre's Health and Safety Coordinator and Health and Safety Unit
  Note. RPE has a number of limitations and does not provide the same level of control as LEV. It therefore must not be automatically used and assumed to be adequate.

Training

All operatives must be trained in how to correctly use the LEV, along with how to carry out and record the routine checks.

Many large LEV systems contain a number of ducts and hoods and have dampers to isolate ones not in use. These systems and their limitations must be well documented and operators trained in the use and correct positioning of the dampers.

Decommissioning LEV

When an LEV system is deemed to be no longer required Estates should be contacted to decommission and remove the system. Estates will then remove it from their active register but retain a copy of all thorough examination and test reports for 5 years.

To assist with the decommissioning of LEV Schools should keep a record of all substances the system is used with. This is particularly important for carcinogens, sensitisers and nanomaterials. The record could be as a list of substances or copies of Chemical Hazard and Risk Assessment forms.

Systems that do not have records of use could incur additional costs for removal as hazardous waste.

Recirculating Units

Recirculating units must be fitted with the appropriate filters to match the contaminant and the filters must be maintained and changed at regular intervals. Contaminated filters must be sealed in bags and disposed of as hazardous waste.

A notice is to be posted at the LEV hood listing the contaminants that the LEV is suitable for.

Fume Cupboards

To request a new fume cupboard the form in Appendix 3 must be completed and sent, along with the relevant risk assessments, to the Health and Safety Unit and Estates.

All fumecupboards must conform to BSEN14175 and the requirements laid out in Appendix 4.

Other LEV Requirements

Airflow Indicators and Alarms

All new LEV systems must have an airflow indicator allowing the operative to tell that the hood airflow is adequate to control exposure, for example a differential pressure gauge. It is also recommend that new systems have an alarm to alert operatives to airflow failure and therefore a loss of adequate control.

Discharge

Extracted air must not re-enter buildings unless the contaminant has reached negligible concentrations.

FURTHER SOURCES OF INFORMATION

Health and Safety Executive (HSE), *Controlling Airborne Contaminants at Work,* HSG 258, 2nd Ed, 2011.

British Standards, *Fume Cupboards Parts 1-6*, BS EN 14175, 2003-2006.

Health and Safety Policy
Hazardous Substances

UHSP/15/HS/10 Schedule 3.8.1

Safe and Sustainable Local Exhaust Ventilation

INTRODUCTION

1. This briefing note provides guidance on achieving a safe and sustainable provision of local exhaust ventilation (LEV) where this equipment is the essential control measure for preventing harmful exposure to airborne hazardous substances. The actions outlined below are necessary to ensure compliance with the relevant legal obligations, and also to maintain important research and operational capabilities. This guidance should be used with reference to other relevant University policy and guidance (including *UHSP/15/HS/10 Schedule 3.8 – Hazardous Substances- Control Measures Local Exhaust Ventilation (LEV)* – currently in DRAFT form).

   A checklist is provided to assist Managers within Budget Centres who have responsibility for LEV to develop a safety and sustainability plan of LEV use in their areas.

2. In practice, responsibility for the safety and sustainability of LEV is likely to be split between users in Budget Centres and the University Estates Department at different points in the "operational lifetime" of an LEV system (from commissioning, design, use, maintenance etc.). Contractors and advisers from Workplace Wellbeing are also expected to play important roles. It is essential that there is regular and effective dialogue between these various stakeholders and establishing this communication is one of the key objectives of this guidance.

3. The stakeholders must co-ordinate the following actions to ensure safe and sustainable use of the LEV systems:

   a. Where a risk assessment has identified a need for LEV, the specification and design of the LEV must be undertaken properly to ensure the system is fit for purpose. This will require users to commission support from Estates and others at the soonest opportunity after the LEV need is identified.

   b. All LEV systems must be designed by a competent person, and thereafter properly installed and commissioned to match the specific requirements of the hazard being controlled (e.g. the LEV must arrest the airborne hazardous substances before it can be inhaled by users, and safely discharge cleaned or diluted air to a point outside the work area).

   c. All LEV systems in service must be fully functioning, be maintained in an efficient state, effective working order, and in good repair. New LEV systems should be formally commissioned, and records created and maintained to demonstrate compliance with all aspects of this guidance.

   d. All LEV systems in service must pass an annual thorough examination and performance test in accordance with the relevant regulations and guidance (HSG 258). The examination and testing must be carried out by a competent person (e.g. a representative from a recognised insurance organisation).

   e. An agreed schedule of planned preventative maintenance must be developed and implemented (by either the users of the LEV, or the users in conjunction with

contractors and/or Estates whichever is the most appropriate arrangement).

f. A maintenance log book must be available for each LEV system, indicating the nature and frequency of the maintenance.

g. Where the levels of risk establish it is appropriate to do so, a description of hazardous materials being controlled by the system must be made available by the users to those persons undertaking the maintenance (including both Estates staff and external contractors).

h. Consideration must be given to energy use and other green impacts (including impacts of the waste-stream on the natural environment).

i. The expected working-life and date for replacement must be anticipated by the users (with advice from Estates where appropriate).

j. Where the need for LEV ceases, LEV systems must be formally decommissioned (and Estates informed so they can make the necessary adjustments to the University Register of LEV).

THE PROVISIONS LEADING TO THE ORGANISATION OF A CO-ORDINATED LEV COMMUNITY

4. As previously stated, sustainable use of LEV requires co-ordinated action from users, maintainers and advisers- and routine and effective communication across this community. The following guidance outlines a framework for organising role-holders.

5. The Heads of Budget Centres (and the Heads of the relevant support departments) are responsible for ensuring sufficient competent role-holders are actively engaged in the provision and maintenance of safe and sustainable LEV.

ACTION ON UNIVERSITY ESTATES ("Designers, installers, and maintainers")

6. Estates will maintain an inventory of all LEV systems used across the University (*The University Register of LEV*). The register will include information on the status of the LEV regarding maintenance and performance testing.

7. Estates will provide support to LEV users regarding the specification, design, installation, commissioning and maintenance of LEV (where appropriate with support from the HR Workplace Wellbeing).

8. Estates must inform users where they become aware that any LEV has failed a performance test or is otherwise dysfunctional.

9. Estates can advise LEV users on energy use and other green impacts.

ACTIONS ON HR WORKPLACE WELLBEING ("Advisers")

10. To provide appropriate advice and support to any role-holders across the LEV community. This is anticipated as being particularly important during the specification, design and commissioning of new LEV systems.

11. To periodically review the status of the Register of LEV.

ACTIONS ON BUDGET CENTRES OPERATING LEV SYSTEMS ("Users")

12. Heads of Budget Centres (e.g. College or Department) are responsible for the safe and sustainable use and maintenance of LEV systems, and for implementation of the specific measures in this guidance where they are applicable. See also *UHSP/15/HS/10 Schedule 3.8 – Hazardous Substances- Control Measures Local Exhaust Ventilation (LEV)* for further detail on the provisions listed below (including further technical guidance).

13. Heads of Budget Centres are required to have notified Estates of all LEV systems in use, and too have arrangements in place that ensure a Safety and Sustainability Plan is developed for all LEV systems in use in their areas[1]. A checklist is provided to assist in the development of these plans.

14. Users of LEV should be organised by Heads of Budget Centres to ensure that the principles of safe and sustainable LEV operations are considered at all times during the development, operation and maintenance of laboratories, workshops, and other workplaces where LEV is in use. The following roles and responsibilities should be established and maintained within any School or Department using LEV:

    a. Nominated manager with overall responsibility for ensuring the **safe use, maintenance and testing** of LEV in each location.

    b. Nominated lead for **the specification and design** of new LEV (the design must be undertaken by a competent LEV designer- but it is typical for designers to require a steer from the users on the nature of the work, substances in use etc). HRWW can assist in specification and design.

    c. Establish arrangements to ensure **information and training** is provided to all users of LEV. The formality of the training should be influenced by the risks.

    d. Ensure **effective supervision** of LEV to ensure it is continually and properly used, and that any failures in the LEV are quickly detected and remedied.

    e. Nominated lead to ensure **continued on-going communications** with Estates, contractors, and Health and Safety Advisers.

    f. Specific requirement for users to inform Estates regarding the need for any new LEV systems, or any changes in status regarding the existing LEV systems so that Estates can maintain the University Register of LEV. Notification to Estates will also initiate the specification and design process (or the commissioning of other support).

    g. Nominate a lead for the development of safety and sustainability plans for all LEV systems in use.

[1] **Note of generic plans**. An LEV Safety and Sustainability Plan can cover more than a single LEV system if the detail within that generic plan is of sufficient to meaningfully influence the specific requirements of all the LEV systems under consideration.

PLANNING AND ACTION FOR SUSTAINABLE LOCAL EXHAUST VENTILATION

Users of LEV can use the checklist to confirm progress on establishing the key stages of planning and delivery of sustainable LEV in their areas. See *UHSP/15/HS/10 Schedule 3.8 – Hazardous Substances- Control Measures Local Exhaust Ventilation (LEV)* for further details

These actions relate to LEV use in the following area(s)
College/School/or Department Locations

Actions	Competed (tick)	Comments and further actions required
Action.- Head of Budget Centre has **nominated role-holders** for all aspects of the safe and sustainable use of LEV?	☐	Each area and each system must have a manager responsible for the continued safe use of LEV.
Action. - All relevant local LEV systems are included on the **University Register/Inventory** of LEV (maintained by Estates)?	☐	
Action. - Persons have been nominated as responsible for **supervising** the continued safe use of LEV in all relevant areas?	☐	
Action. - Effective arrangements to **ensure routine maintenance** of LEV?, including a formally agreed schedule of planned preventative maintenance?	☐	Using Estates or contractors or others to undertake maintenance.
Action.- The provision of a **maintenance log book** for each system, and an arrangement for ensuring that logbook is used?	☐	
Action.- Effective arrangements are in place for the annual **thorough examination and testing** of LEV (and production of records of this).	☐	
Action.- Arrangements are in place to ensure that new LEV systems (and modifications to existing LEV) are **designed and installed** by competent persons?	☐	HRWW are available to advise.
Action.- Arrangements are in place to ensure all users of LEV are provided with **information** on safe and sustainable use of LEV (and provided with **training** where this is appropriate)?	☐	
Action.- Arrangements are in place for ensuring proper consideration of **sustainability, energy usage, and any other green impacts** from the use of the LEV?	☐	
Action.- A process is in place for estimating and periodically reviewing the **expected working life** of the LEV, and for **anticipating the renewal or replacement needs**?	☐	
Action.- A process for notifying Estates of any decommissioning of LEV systems?	☐	
Other	☐	

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Request for Local Exhaust Ventilation system – excluding fume cupboards

For effective control of airborne hazardous substances the following criteria must be considered in the specification and designprocess.Failure to cover these elements can result in ineffective, unreliable, or expensive LEV.

Please complete sections 1 and 2 and return to: Dean Cross d.f.cross@bham.ac.uk
Kevin George k.george@bham.ac.uk

School:		Location:			
Contact name:		Email:		Telephone:	

Section 1:

Process

Description of process that is producing the airborne contaminant:
Operating temperature of process:

Contaminant Characteristics:

Type of contaminant:	Please select
Substance name:	
Volatility of liquid:	Please select:
Boiling point of liquid:	
Dustiness of solid:	Please select:
Amount used:	Please select:

Contaminant Sources

Number of sources to be captured/controlled:	
Volume of each source :	
Rate of release:	
Direction:	
Contaminant concentration:	

Section 2

Hazard Banding:

Please select the hazard band for the contaminants based on their risk phrases or hazard statements.
*risk phrases or hazard statements can be found in the substances safety data sheet or on HAZDAT.

If in doubt please contact your Health and Safety Coordinator

Hazard Band	Risk Phrase	Hazard Statement
A	36, 38, 65, 67 and all not otherwise listed	303, 304, 305, 313, 315, 316, 318, 319, 320, 333, 336 and all not otherwise listed
B	20, 21, 22, 68/20/21/22	302, 312, 332, 371
C	23, 24, 25, 34, 35, 37, 41, 43, 48/20/21/22, 39/23/24/25, 68/23/24/25	301, 311, 314, 317, 318, 331, 335, 370,373
D	26, 27, 28, 40, 60, 61, 62, 63, 64, 48/23/24/25, 39/26/27/28	300, 310, 330, 351, 360, 361, 362, 372
E	42, 45, 46, 49, 68	334, 340, 341, 350

Return form to Health and Safety Unit and Estates(d.f.cross@bham.ac.uk and k.george@bham.ac.uk)

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Hazardous Substances

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Request for New Fume Cupboard

I understand that a new fume cupboard is proposed for the location indicated below. The design and installation requirements are to a large extent determined by the obligation to comply with the COSHH regulations and to take account of current standards. However, so far as is possible, it is intended that the specification incorporate requirements indicated by the user. In order to meet these objectives the following information is needed. Please complete and return to: Dean Cross (d.f.cross@bham.ac.uk)
Kevin George (k.george@bham.ac.uk)

School..... **Location**.....

Usage*(Delete hazards, etc. which will NOT be involved)*

◆Hydrofluoric acid/volatile fluorides ◆Other volatile acids, etc. ◆Perchloric acid

◆Ammonia or amines ◆Flammable substances ◆Aromatic/halogenated solvents

◆Carcinogens ◆Other "Very Toxic" compounds ◆Radioactive substances

◆Compressed gas ◆Heat above 2kW

Briefly describe process(es)*(indicate quantities and size of apparatus)*

.....

.....

.....

.....

.....

.....

.....

Services*(specify number)*

Electric socket outlets..... Water outlets: hot....., cold.....

Mains gas outlets..... Compressed air..... Other gas (specify).....

Vacuum outlets..... Sink (and size mm)..... and/or drip cup.....

Dimensions

Internal width.....mm Internal depth.....mm Min. internal height.....mm

Max. sash opening.....mm Height of work surface above floor level.....mm

Signed..... Date.....

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UHSP/15/HS/10 Schedule 3.8.4

Fume Cupboard System Specification

The following is a specification for a general purpose laboratory fume cupboard. All University fume cupboards should conform to this specification. This is the minimum requirement. However, certain of these features such as the face velocity or the fabric will need to be modified for a particular installation where, for example, the level of hazard is high or where the substances used are damaging to the normal materials of construction. Amended or further requirements for a particular installation will be notified separately by the University Health and Safety Unit. The design, construction and siting and the complete installation of a fume cupboard should conform to the recommendations in **BS EN 14175**[2] and, in particular, to the following specifications.

The Fume Cupboard

Face Velocity:

Either

- no individual measurement in the plane of the sash less than 0.55 m/sec. and no measurement less than or greater than 20% of the average face velocity; or
- an average face velocity of 0.4m/s and no measurement less than or greater than 10% of the average, provided
    - Containment is < 0.005ppm, Robustness of Containment is < 0.1 ppm and Air Exchange Efficiency is < 10 seconds;

when the sash is set at 500 mm.

Audio Visual Indicators:

(a) green lamp, labelled "sash safe", to indicate sash below 500 mm;

(b) red lamp, labelled "sash high", and audible alarm to indicate sash above 500 mm; the alarm to be equipped with a mute button which is automatically re-set when the sash is returned to below 500 mm;

(c) green lamp, labelled "airflow safe", to indicate the face velocity specified above is being exceeded at all points in the plane of the sash;

(d) red warning lamp, labelled "airflow failed", and audible alarm to indicate that the lowest value of face velocity is below the value specified above (for commissioning purposes, the alarm should be set to operate at not less than 90% of the specified value).

Work Surface:

this must be smooth, non-absorbent and easily decontaminated with any internal angles/corners rounded; it should have raised edges to contain spillage and be made of one-piece ceramic or cast epoxy resin. The dished area of the work surface must not extend under the airfoil referred to in paragraph 2 of "Design" below. A minimum distance of 50 mm is required between the edge of the dished area and the rear of the airfoil.

Liners and rear baffle:

should be of solid epoxy resin.

NB The sealing compounds used at the joins of work surface and liners should be epoxy based.

Sash:

this should be of toughened glass, with a sash lock fitted at 500mm (NB not a security lock, but a releasable physical stop).

[2] Fume Cupboards, BS EN 14175-Parts 1,2 3, 4 and 6::2006 and DD CEN/TS 14175-5:2006

Design:

1 surfaces must be smooth, non-absorbent and easily decontaminated with any internal angles, joints/corners, rounded, i.e. coved;

2 an **aerodynamically styled facia** (bevelled edges to opening) with a gap left between the airfoil at the bottom of the facia and the front edge of the work surface;

3 a **rear baffle**;

- the rear baffle should be angled near the top to form an imaginary apex with the ceiling of the fume cupboard which should be sloped from the front at a similar angle or similar aerodynamic feature proven by development;
- the exhaust slot formed between the bottom of the baffle and the rear of the work surface should be covered by a coarse arrestor to prevent tissues and other light items from being drawn into the exhaust system;

4 a **bypass** arrangement, with the inlet located so as not to interfere with the aerodynamic facia and also to direct the expansion path from any explosion within the fume cupboard up and away from the operator, unless a VAV fume cupboard is installed;

5 **internal fittings,** including sinks, must not be closer than 150 mm to the plane of the sash;

6 **sinks**, if fitted, must be integral to the work surface with no overhanging lips and connections to the waste system must be via a small trap (existing waste systems may need to be refurbished).

Typical Dimensions:

Internal width 1200 mm; internal depth 650mm; internal height 1100mm; height of work surface above floor 900mm; max. sash opening 750mm.

Services

As specified by user on *Fume Cupboard Requirements* form,

BUT, in the absence of user specification, a minimum of one cold water outlet and drip cup and one double 13 amp electric socket,

AND subject to any specific comments on particular installation by the University Health and Safety Unit.

Siting of fume cupboard:

1 the distance from the plane of the sash to any space used frequently or for movement of other personnel should be at least 1000 mm;

2 the distance between the plane of the sash and a bench opposite to it and used by the same operator should be at least 1400 mm;

3 there should be no opposing wall (or other obstruction likely to affect the airflow) within 1400 mm of the plane of the sash for a single fume cupboard but may need to be as much as 2000mm for a higher airflow fume cupboard or a bank of fume cupboards;

4 no fume cupboard should be installed in a position where it is likely to be affected by another item of equipment. In particular, the distance from the plane of the sash to the sash of an opposing fume cupboard, to the face of an open fronted safety cabinet, or to the edge of an exhaust hood, should be carefully considered;

5 any room air supply diffuser should not cause an airflow exceeding 0.2m/s within 400 mm of the sash;

6 no fume cupboard should be positioned with either side closer than 300 mm from a wall or similar obstruction;

7 no large obstruction, e.g. an architectural column, projecting beyond the plane of the sash should be within 300 mm of the side of the fume cupboard;

8 no doorway should be within 1000 mm of the plane of the sash or within 300 mm of the side of a fume cupboard;

9 if a fume cupboard is not designed to contain a possible fire or explosion, the fume cupboard should not be sited in a position where exit from a work space to the only escape route will necessitate passing directly in front of the fume cupboard.

The unobstructed floor area in front of a fume cupboard should be outlined on three sides by 50mm red tape applied to the floor, 300 mm from each side and 1400 mm from the plane of the sash. A

prohibition sign (using the symbol and colouring conforming with*The Safety Signs and Signals Regulations 1980*) displaying the wording "Do not place furniture or equipment in the area outlined in red" should be affixed to the lower part of the door to the unventilated under cupboard.

If it is necessary to display a sign prohibiting the use of an adjacent window, this should follow the format specified above and contain the wording "Do not open window while fume cupboard is in use".

Ventilated Understorage

Part of the understorage should be fitted out for the storage of toxic/corrosive substances. A 200 mm, black on yellow, triangular ***corrosive*** hazard warning sign conforming to ***The Health and Safety (Safety Signs and Signals) Regulations 1996*** should be applied to the door of this compartment.
The compartment and its fittings should be non-corrodable and fitted with 50 mm deep, corrosion-proof trays for spill containment near centre and at bottom (the distance between these two trays should allow the storage of 2.5 litre Winchester bottles in the bottom of the cupboard.
The compartment should be vented at low level via a small duct connected into the fume cupboard exhaust duct.

Fume Discharge System

1 **Negative pressure** inside building (fan positioned outside building);

2 **exhaust fan speed control** to maintain steady state speed control after commissioning and to allow adjustment by variable speed controller located adjacent to the fume cupboard, but inside a secure box separate from the main control panel;

3 high velocity vertical discharge, not less than 10 m/s;

4 a **minimum height of the top of the stack** above ground level of normally 1.25 times the height of the highest point of the building or 3 m above the highest point of the building, whichever is the greater;

5 the**fan and motor** specifications should assume highly flammable fume discharge.

Airflow Sensor:

this should be of the type produced by TEL Ltd whereby the airflow through an orifice in the ceiling of the fume cupboard chamber is monitored by a calibrated diode to provide a signal for audio-visual airflow indicators.

Materials of construction

The materials of construction of the fume cupboard system must be compatible with the substances used or generated in the system.

Air Make-Up System

Where it is necessary to install an air make-up system, the system should provide 90-95% ,filtered, heated, fresh air to replace the air extracted by a fume cupboard(s).

Audio Visual Indicators on main control panel:

The following to be activated by pressure switch sensing differential pressure across make-up air fan:

(a) green lamp, labelled "make-up airflow on", to indicate make up airflow operating;

(b) red warning lamp, labelled "make-up airflow failed", and audible alarm to indicate make up airflow below 50% of fume cupboard exhaust volume.